

BUCHANAN - 10/830,168  
Attorney Docket: P2004J011

IN THE CLAIMS:

Please amend the claims as follows:

1. (Currently Amended) A separation system for de-entraining liquid particles from an upwardly flowing gaseous stream comprising:

a de-entrainment zone of vertically spaced, parallel tiers of elongated, U-shaped, liquid collector channels arrayed transversely to the flow of the gaseous stream,

wherein each of the elongated, U-shaped, liquid collector channels having a bottom portion and a pair of sidewalls extending therefrom,

wherein each tier having parallel rows of collector channels which are staggered vertically from the rows in the next adjacent tier to deflect the flow of the gaseous stream from a lower tier through gaps between adjacent rows in an upper tier, to separate entrained liquid from the gaseous stream and permit the separated liquid to descend into channels of a lower tier for collection, with a plurality of horizontally-elongated flow deflectors extending parallel to each channel in the region between an upper tier and an adjacent lower tier, in a direction downwards towards a channel of the lower tier,

wherein each of the plurality of horizontally-elongated flow deflectors of an upper tier deflects at least a portion of the gaseous stream into a corresponding channel of the lower tier,

wherein each deflector extends below the bottom portion.

2. (Original) A separation system according to Claim 1 in which the total area of the gaps between the channels of the tier is less than the total area of the tier.

3. (Previously Presented) A separation system according to Claim 2 in which the total area of the gaps between the channels of the tier is from 35 to 50 percent of the total area of the tier.

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4. (Original) A separation system according to claim 1 in which the tiers are disposed at an angle no more than 10 percent from the horizontal.

5. (Original) A separation system according to claim 1 in which each flow deflector is attached to a bottom portion of a channel of the upper tier.

6. (Original) A separation system according to Claim 5 in which each flow deflector is attached at the side of a bottom portion of a channel of the upper tier.

7. (Currently Amended) A separation system ~~according to claim 6 in which for de-entraining liquid particles from an upwardly flowing gaseous stream comprising:~~

a de-entrainment zone of vertically spaced, parallel tiers of elongated, U-shaped, liquid collector channels arrayed transversely to the flow of the gaseous stream,

wherein each tier having parallel rows of collector channels which are staggered vertically from the rows in the next adjacent tier to deflect the flow of the gaseous stream from a lower tier through gaps between adjacent rows in an upper tier, to separate entrained liquid from the gaseous stream and permit the separated liquid to descend into channels of a lower tier for collection, with a plurality of horizontally-elongated flow deflectors extending parallel to each channel in the region between an upper tier and an adjacent lower tier, in a direction downwards towards a channel of the lower tier,

wherein the channels of the lower tier have foraminous extensions in the region between the upper tier and the lower tier, and the channels of an upper tier have downwardly extending deflectors attached to their bottom portions.

8. (Currently Amended) A separation system ~~according to claim 6 in which for de-entraining liquid particles from an upwardly flowing gaseous stream comprising:~~

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a de-entrainment zone of vertically spaced, parallel tiers of elongated, U-shaped, liquid collector channels arrayed transversely to the flow of the gaseous stream,

wherein each tier having parallel rows of collector channels which are staggered vertically from the rows in the next adjacent tier to deflect the flow of the gaseous stream from a lower tier through gaps between adjacent rows in an upper tier, to separate entrained liquid from the gaseous stream and permit the separated liquid to descend into channels of a lower tier for collection, with a plurality of horizontally-elongated flow deflectors extending parallel to each channel in the region between an upper tier and an adjacent lower tier, in a direction downwards towards a channel of the lower tier,

wherein each flow deflector is attached to a bottom portion of a channel of the upper tier and the channels of an upper tier have foraminous extensions in the region above the upper tier, to which downwardly extending deflectors are attached.

9. (Original) A separation system according to claim 1 in which the flow deflectors are attached to the channels of the lower tier.

10. (Withdrawn) A separation system according to claim 9 in which the channels of the lower tier have foraminous extensions in the region between the upper tier and the lower tier, to which the deflectors are fixed.

11. (Currently Amended) A multi-tray distillation unit having comprising:  
at least one contact tray for contacting a gaseous stream flowing upwardly in the unit with liquid passing downwardly through the unit; and  
at least one separator for de-entraining liquid particles from the gaseous stream after passing through liquid on the contact plate,  
wherein the at least one separator comprising vertically spaced, parallel tiers of elongated, U-shaped, liquid collector channels arrayed transversely to the flow of the gaseous stream,

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wherein each tier having parallel rows of collector channels which are staggered vertically from the rows in the next adjacent tier to deflect the flow of the gaseous stream from a lower tier through gaps between adjacent rows in an upper tier, to separate entrained liquid from the gaseous stream and permit the separated liquid to descend into channels of a lower tier for collection,

wherein each of the elongated, U-shaped, liquid collector channels having a bottom portion and a pair of sidewalls extending therefrom,

wherein each upper tier channel having at least one rigidly-mounted, horizontally-elongated flow deflector extending downward from the upper tier channel towards a lower tier channel below the deflector,

wherein each of the plurality of horizontally-elongated flow deflectors of an upper tier deflects at least a portion of the gaseous stream into a corresponding channel of the lower tier,

wherein each deflector extends below the bottom portion.

12. (Original) The distillation unit of claim 11 which comprises a plurality of superimposed separators.

13. (Original) The distillation unit of claim 11 in which each flow deflector is attached at the side of a bottom portion of a channel of the upper tier.

14. (Currently Amended) A multi-tray ~~The distillation unit of claim 13 in which comprising:~~

at least one contact tray for contacting a gaseous stream flowing upwardly in the unit with liquid passing downwardly through the unit; and

at least one separator for de-entraining liquid particles from the gaseous stream after passing through liquid on the contact plate, the at least one separator comprising

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vertically spaced, parallel tiers of elongated, U-shaped, liquid collector channels arrayed transversely to the flow of the gaseous stream,

wherein each tier having parallel rows of collector channels which are staggered vertically from the rows in the next adjacent tier to deflect the flow of the gaseous stream from a lower tier through gaps between adjacent rows in an upper tier, to separate entrained liquid from the gaseous stream and permit the separated liquid to descend into channels of a lower tier for collection,

wherein each upper tier channel having at least one rigidly-mounted, horizontally-elongated flow deflector extending downward from the upper tier channel towards a lower tier channel below the deflector,

wherein the channels of the lower tier have foraminous extensions in the region between the upper tier and the lower tier, and the channels of an upper tier have downwardly extending deflectors attached to their bottom portions.

15. (Currently Amended) A multi-tray distillation unit of claim 13 in which comprising:

at least one contact tray for contacting a gaseous stream flowing upwardly in the unit with liquid passing downwardly through the unit; and

at least one separator for de-entraining liquid particles from the gaseous stream after passing through liquid on the contact plate, the at least one separator comprising vertically spaced, parallel tiers of elongated, U-shaped, liquid collector channels arrayed transversely to the flow of the gaseous stream,

wherein each tier having parallel rows of collector channels which are staggered vertically from the rows in the next adjacent tier to deflect the flow of the gaseous stream from a lower tier through gaps between adjacent rows in an upper tier, to separate entrained liquid from the gaseous stream and permit the separated liquid to descend into channels of a lower tier for collection,

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wherein each upper tier channel having at least one rigidly-mounted, horizontally-elongated flow deflector extending downward from the upper tier channel towards a lower tier channel below the deflector.

wherein the channels of an upper tier have foraminous extensions in the region above the upper tier, to which downwardly extending deflectors are attached.

16. (Original) The distillation unit of claim 11 in which the flow deflectors are attached to the channels of the lower tier.

17. (Original) The distillation unit of claim 11 which includes a liquid downcomer into which the channels have outlets for collected, separated liquid and which has an outlet for the collected liquid through a liquid seal onto a contact plate.

18. (Original) The distillation unit of claim 17 in which the liquid downcomer has a liquid outlet at a contact plate below the level of the plate at which the entrainment has taken place.

19. Cancelled.

20. Cancelled.

21. (New) The separation system according to claim 9, wherein the deflector extends at angle to the bottom portion and the sidewall away from the bottom portion.

22. (New) The separation system according to claim 1, wherein each of the elongated, U-shaped, liquid collector channels in the upper tier having a cap deflector interconnecting adjacent channels.

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23. (New) The separation system according to claim 22, wherein a portion of the cap deflector depends downwardly into one of the channels in the upper tier.

24. (New) The separation system according to claim 22, wherein the cap deflector having a foraminous portion.